REMARKS

The holding of allowability in claims 6, 19 and 15 is gratefully acknowledged.

<u>Art rejections</u>

Withdrawal of the prior art rejections is gratefully acknowledged.

The current art rejections are respectfully traversed.

Any of the Examiner's rejections and/or points of argument that are not addressed below would appear to be moot in view of the following. Nevertheless, Applicants reserve the right to respond to those rejections and arguments and to advance additional arguments at a later date. No arguments are waived and none of the Examiner's statements are conceded.

The Examiner now cites Ury (US4695757).

<u>Claim 1</u>

The Examiner states that Ury discloses a discharge lamp. Applicants respectfully disagree. Applicants enclose a definition from Wikipedia of "gas-discharge lamp," redirected from "discharge lamp." According to this definition, a discharge lamp is one where the discharge results from passing electrical <u>charge</u> through ionized gas. The device of Ury is activated by bombarding gas with microwaves. The reference states that its lamp is without electrodes. Applicants accordingly respectfully submit that Ury does not involve any discharge and is therefore not a discharge lamp.

The Examiner states that the cooling device of Ury does not substantially extend into a beam path produced by the lamp and the reflector. Applicants find this assertion particularly

baffling. Ury shows an intrusive cooling mechanism 60, 62, 64, 66 disposed within the reflector cavity and therefore substantially extending into the beam path. Applicants respectfully submit that the Examiner has mischaracterized the reference.

Perhaps the Examiner is intending to draw some distinction between the nozzle and conduit of Ury? Applicants would like to remind the Examiner of the *Philips* case, recently decided, which held that Applicants' specification should be the primary source of definitions of terms. Applicants do not draw this distinction between conduit and nozzle in their application. Bringing this distinction, which is particular to a single patent document relating to a lamp in another field, into the rejection would be improper as it does not relate to the way the term "nozzle" is used in this application.

In any case, even the nozzle portions of the cooling system of Ury do extend substantially into the beam path, since they are between the light source 30 and the reflector 56. Why does the Examiner think the Ury nozzles are not substantially blocking the beam path?

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 1.

Nevertheless, Applicants have added new claim 25, which states that no part of the cooling means is located inside the cavity formed by the reflector, which distinguishes even more clearly over the reference.

<u>Claim 2</u>

This claim recites that a nozzle sends a flow of gas through a hole, as part of the cooling means.

REMARKS

The Examiner points to element 40 of the reference as allegedly being such a hole. Applicants respectfully submit that the Examiner mischaracterizes the reference. As far as Applicants can tell, element 40 is a slot for the waveguide 44, per col. 3, ll. 11-12, where microwaves enter the lamp. Applicants understand these microwaves not to be for cooling but for exciting the plasma within the lamp envelope.

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 2.

Claim 8

Claim 8 recites that a velocity of flow of gas can be controlled as a function of operation position.

The Examiner purports to find this at col. 2, ll 1-11 of the reference. Applicants respectfully submit that the Examiner mischaracterizes the reference. A glance at the bottom of col. 2 seems to indicate that the velocity of gas is constant while the lamp rotates, to achieve cooling everywhere.

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 8.

Claim 11

This claim recites that a nozzle has an opening at the boundary of the reflector. The Examiner purports to find this recitation in Ury. Applicants respectfully submit that the

REMARKS

Examiner mischaracterizes the reference. The openings of the nozzles 64, 66 are well inside the reflector cavity, not at the boundary of the reflector.

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 11.

<u>Claim 12</u>

Claim 12 recites that the nozzle is arranged perpendicularly to the beam path. Again the Examiner purports to find this in Ury. Applicants respectfully submit that the Examiner mischaracterizes the reference. Applicants see nozzles 64 and 66 as being at odd and indeterminate angles. Applicants do not see how they could be interpreted as perpendicular to any beam path.

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 12.

<u>Claim 17</u>

This claim recites that the nozzle does not substantially reduce an amount of light in a beam path.

Again the Examiner cites Ury. Applicants remain baffled as to why the Examiner thinks the nozzles of Ury qualify, since they are between the light source and the reflector. How could they not substantially reduce the light in the beam path?

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 17.

REMARKS

<u>Claim 19</u>

Claim 19 recites that control of the flow as a function of position occurs automatically responsive to sensed position.

The Examiner purports to find this at col. 2, lines 59-68 of the reference. Applicants respectfully submit that the Examiner mischaracterizes the reference. Applicants have read this portion of the reference and understand it differently. They understand that the flow of cooling gas is taught here to be constant during rotation so that the entire lamp is cooled. Applicants do not understand there to be any control of the flow as a function of position.

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 19.

<u>Claim 20</u>

Claim 20 recites non-uniform cooling.

The Examiner purports to find this in the reference. Applicants respectfully submit that the Examiner mischaracterizes the reference. Applicants see quite the contrary that the entire surface area is cooled, per col. 2, line 64.

Applicants accordingly respectfully submit that the Examiner has not made a *prima facie* case against claim 20.

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REMARKS

Applicants respectfully submit that they have addressed each issue raised by the Examiner — except for any that were skipped as moot. Allowance is accordingly respectfully requested.

Respectfully submitted,

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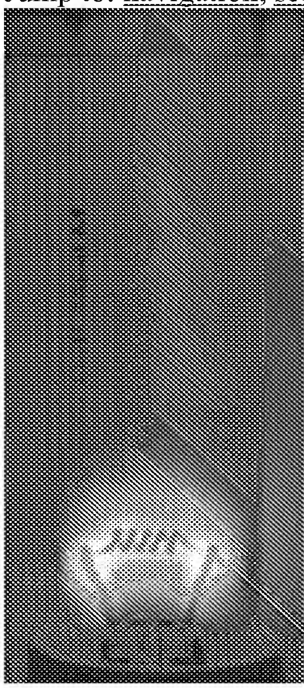
Gas-discharge lamp

From Wikipedia, the free encyclopedia

(Redirected from Discharge lamp)
Jump to: navigation, search



Germicidal lamps are simple low pressure mercury vapor discharges in a fused quartz envelope.

Gas discharge lamps are a family of artificial light sources that generate light by sending an electrical discharge through an ionized gas, i.e. a plasma. The character of the gas discharge critically depends on the frequency or modulation of the current: see the entry on a frequency classification of plasmas. Typically, such lamps use a noble gas (argon, neon, krypton and xenon) or a mixture of these gases. Most lamps are filled with additional materials, like mercury, sodium, and/or metal halides. In operation the gas is ionized, and free electrons, accelerated by the electrical field in the tube, collide with gas and metal atoms. Some electrons circling around the gas and metal atoms are excited by these collisions, bringing them to a higher energy state. When the electron falls back to its original state, it emits a photon, resulting in visible light or ultraviolet radiation. Ultraviolet radiation is converted to visible light by a fluorescent coating on the inside of the lamp's glass surface for some lamp types. The fluorescent lamp is perhaps the best known gas discharge lamp.

Gas discharge lamps offer long life and high light efficiency, but are more complicated to manufacture, and they require electronics to provide the correct current flow through the gas.

Contents

[edit] History

Francis Hauksbee first demonstrated a gas discharge lamp in 1705. He showed that an evacuated or partially evacuated glass globe, while charged by static electricity could produce a light bright enough to read by. Sir Humphry Davy demonstrated in 1802 the first electric arc at the Royal Institution of Great Britain. Since then, discharge light sources have been researched because they create light from electricity considerably more efficiently than incandescent light bulbs.

Later it was discovered that the arc discharge could be optimized by using an inert gas instead of air as a medium. Therefore noble gases neon, argon, krypton or xenon were used, as well as carbon dioxide historically.

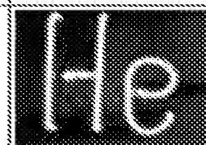
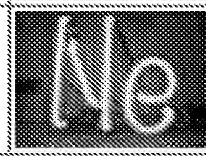
The introduction of the metal vapor lamp, including various metals within the discharge tube, was a later advance. The heat of the gas discharge vaporized some of the metal and the discharge is then produced almost exclusively by the metal vapor. The usual metals are sodium and mercury owing to their high vapor pressures that increase efficiency of visible spectrum emission.

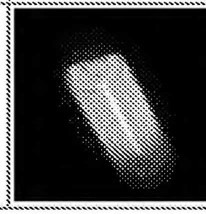
One hundred years of research later led to lamps without electrodes which are instead energized by microwave or radio frequency sources. In addition, light sources of much lower output have been created, extending the applications of discharge lighting to home or indoor use.

[edit] Color

Each gas, depending on its atomic structure emits certain wavelengths which translates in different colors of the lamp. As a way of evaluating the ability of a light source to

reproduce the colors of various objects being lit by the source, the International Commission on Illumination (CIE) introduced the color rendering index. Some of gas discharge lamps exhibit indexes below 100 which means that the colors appear completely different from, for instance with sun-light illumination. Some people are unconsciously aware of this phenomenon and when buying clothes, they try to illuminate them with sun-light in order to know the "*real*" color.

Gas	Color	Notes	Image
Helium	Whitish orange; under some conditions may be grayish, bluish, or green-bluish	Used by artists for special purpose lighting.	
Neon	Red-orange	Intensive light. Used frequently in neon signs and neon bulbs.	
Argon	Violetish pale lavender blue	Often used together with mercury vapor.	
Krypton	Grayish dim off-white. May be greenish. At high peak currents bright blue-white.	Used by artists for special purpose lighting.	
Xenon	Grayish or bluish-gray dim white, at high peak currents very bright green-bluish	Used in xenon flash lamps, xenon HID headlamps, and xenon arc lamps, and by artists for special purpose lighting.	
Nitrogen	Similar to argon, duller, more pinkish; at high peak currents bright bluish-white, whiter than argon		
Oxygen	Violet-lavender, dimmer than argon		
Hydrogen	Lavender at low currents, pinkish magenta over 10 mA		
Water vapor	Similar to hydrogen, dimmer		
Carbon	Slight bluish-white, in		

dioxide	lower currents brighter than xenon		
Mercury vapor	Light blue, intense ultraviolet	In combination with phosphors used to generate many colors of light. Widely used in mercury-vapor lamps and hydrargyrum medium-arc iodide lamps. Often used together with argon.	
Sodium vapor (low pressure)	Bright yellow	Widely used in sodium vapor lamps.	

[edit] Most common gas discharge lamps

[edit] Low pressure discharge lamps

- Fluorescent lamps, the most common lamp in office lighting and lots of other applications, produces up to 100 lumens/watt
- Low pressure sodium lamps, the most efficient gas discharge lamp type, producing up to 200 lumens/watt, but at the expense of very poor color rendering. The almost monochromatic yellow light is only acceptable for street lighting and similar applications.

[edit] High pressure discharge lamps

- Metal halide lamps. These lamps produce almost white light, and attain 100 lumen/watt light output. Applications include indoor lighting of high buildings, parking lots, shops, sport terrains.
- High pressure sodium lamps, producing up to 150 lumens/watt. These lamp produce a broader light spectrum than the low pressure sodium lamps. Also used for street lighting, and for artificial photoassimilation for growing plants
- High pressure mercury-vapor lamps. This lamp type is the oldest high pressure lamp type, being replaced in most applications by the metal halide lamp and the high pressure sodium lamp.

[edit] Other examples

- Neon signs may use either direct illumination or (to obtain certain colors), indirect phosphor excitation.

- Xenon flash lamp. This lamp is commonly found in film and digital cameras, even in single-use cameras. These lamps have produced interesting illumination effects in theatre and dancing. More robust versions of this lamps can produce short intense flashes repeatedly, allowing the stroboscopic examination of repetitive motion (useful in certain balancing applications). These were at one time popular, "freezing" the motion of the actors or dancers. This type of lamp was also used to demonstrate persistence of vision, where an entire room would be illuminated by multiple lamps behind diffusing wall panels. In this otherwise darkened room a periodic flash would cause every detail of the occupants to be imaged on the observer's retina, completely frozen in motion.

[edit] External links

- Museum of historic discharge lamps
- http://www.thebakken.org/artifacts/Hauksbee.htm

[edit] See also

- Fluorescent lamp
- List of light sources
- Electric glow discharge
- Electric arc
- Emission spectrum

Categories: Lamps

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- Article
- Discussion
- Edit this page
- History

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- Main Page
- Contents
- Featured content